Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method, comprising:

providing a microarray comprising a plurality of DNA cells;

placing the microarray in an optical degenerate four-wave mixing (DFWM) system operating at an optical wavelength within an absorption spectral range of the DNA cells to generate a DFWM signal in one DNA cell;

placing a single template located between the microarray and an optical detector to include holes arranged to selectively transmit the DFWM signal from the microarray to the optical detector and to block pump light and probe light in the DFWM system from entering the optical detector;

measuring an output of the optical detector to represent the DFWM signal; **[[**and**]]**

removing a background noise in the measured DFWM signal of the one DNA cell by using a DFWM measurement of a blank area between the one DNA cell and an adjacent DNA cell; and

scanning a position of the microarray to place other DNA cells **of the microarray** in the DFWM system to get respective DFWM signals.

2. (Previously Presented) A method, comprising:

providing a microarray comprising a plurality of DNA cells;

placing the microarray in an optical degenerate four-wave mixing (DFWM) system operating at an optical wavelength within an absorption spectral range of the DNA cells to generate a DFWM signal in one DNA cell;

moving the microarray in the DFWM system to measure DFWM signals for different areas and different DNA cells;

wherein the microarray has a blank area between two adjacent DNA cells, and the method further comprising:

scanning the blank area through the DFWM system to measure a signal; and

using the measured signal in the blank area to determine a level of hybridization and washing in preparing the DNA cells and background optical noise.

3. (Currently Amended) A method, comprising:

providing a microarray comprising a plurality of DNA cells;

placing the microarray in an optical degenerate four-wave mixing (DFWM) system operating at an optical wavelength within an absorption spectral range of the DNA cells to generate a DFWM signal in one DNA cell;

moving the microarray in the DFWM system to measure DFWM signals for different areas and different DNA cells;

scanning the position of the microarray to place different locations within a DNA cell in the DFWM system to obtain different DFWM signals from the DNA cell; and

using the different DFWM signals from the DNA cell to determine **spatial** inhomogeniety within the DNA cell.

4. Canceled.

5. (Original) The method as in claim 1, further comprising using a forward-scattering DFWM configuration in the DFWM system to produce each DFWM signal.

6. (Original) The method as in claim 5, wherein the forward scattering DFWM configuration receives one pump beam and one probe beam to produce a DFWM signal.

7. (Original) The method as in claim 1, further comprising using a backward-scattering DFWM configuration in the DFWM system to produce each DFWM signal.

Claims 8-16: canceled.

17. (Previously Presented) The method as in claim 2, further comprising using a forward-scattering DFWM configuration in the DFWM system to produce each DFWM signal.

18. (Previously Presented) The method as in claim 17, wherein the forward scattering DFWM configuration receives one pump beam and one probe beam to produce a DFWM signal.

19. (Previously Presented) The method as in claim 2, further comprising using a backward-scattering DFWM configuration in the DFWM system to produce each DFWM signal.

20. (Previously Presented) The method as in claim 3, further comprising using a forward-scattering DFWM configuration in the DFWM system to produce each DFWM signal.

21. (Previously Presented) The method as in claim 20, wherein the forward scattering DFWM configuration receives one pump beam and one probe beam to produce a DFWM signal.

22. (Previously Presented) The method as in claim 3, further comprising using a backward-scattering DFWM configuration in the DFWM system to produce each DFWM signal.